

Chapter 3 Systems of Linear Equations and Introduction to Determinants (Summary)

Exercises / Section 3.1 (page 84)

- Solve the following systems of equations graphically.

Problem # 1.  $2x - y = 1$   
 $x - y = 2$

Problem # 5.  $-x - 3y = 4$   
 $2x + 2y = 5$

Problem # 7.  $2x + 3y = 2$   
 $3x + 2y = 1$

Problem # 9.  $5x - 2y = 9$   
 $4x - 3y = 4$

Problem # 11.  $3x + y = 0$   
 $x - 2y = 20$

(Problems solved in class # 1, 11)

HW: Problem # 5, # 7, # 9

Exercises / Section 3.2 (page 90-91)

- Solve the following systems of equations by the method of addition or subtraction.

Problem # 1.  $x + y = 4$   
 $2x - y = 5$

Problem # 5.  $3x - 2y = 21$   
 $4x - 5y = 42$

Problem # 7.  $4x - 3y = -11$   
 $12x + 25y = 69$

Problem # 9.  $2x + 2y = 1$   
 $5x - 5y = 1$

- Solve the following systems of equations by the method of substitution.

Problem # 15.  $2x + y = 1$   
 $x + 3y = 8$

Problem # 17.  $8x - 10y = -13$   
 $x + 2y = 0$

Problem # 19.  $5x + 2y = 3$   
 $6x + 3y = 2$

- Solve the following systems of equations by either method.

Problem # 23.  $3x - 2y = 1$   
 $6x - 4y = 5$

Problem # 27.  $\frac{2}{x} - \frac{3}{y} = 1$   
 $\frac{3}{x} - \frac{2}{y} = 2$

Problem # 35.  $2w - 3z = 5$   
 $4w - 6z = 10$

Problem # 37.  $-2v + 5w = 10$   
 $4v - 10w = 15$

(Problems solved in class # 1, 9, 15, 23, 35)

HW: Problem # 5, 7, 17, 19, 27, 37

Exercises / Section 3.3 (page 95-96)

- Expand each determinant. Problem # 3.  $\begin{vmatrix} -2 & 4 \\ 4 & -8 \end{vmatrix}$

Problem # 9.  $\begin{vmatrix} -2 & -1 \\ 12 & 5 \end{vmatrix}$

Problem # 13.  $\begin{vmatrix} 32 & 21 \\ -17 & 16 \end{vmatrix}$

Problem # 15.  $\begin{vmatrix} 18 & -6 \\ 75 & 0 \end{vmatrix}$

- Solve the following systems of equations by using Cramer rule.

Problem # 17.  $3x + 4y = 1$   
 $2x + 3y = 4$

Problem # 25.  $\frac{2}{x} - \frac{3}{y} = 7$   
 $\frac{1}{x} + \frac{5}{y} = 3$

Problem # 31.  $F_1 + 2F_2 = 5$   
 $2F_1 + F_2 = 6$

Problem # 33.  $3R_1 + 4R_2 = 20$   
 $4R_1 + 2R_2 = 15$

(Problems solved in class # 3, 15, 17, 31)

HW: Problem # 9, 13, 25, 33

Exercises / Section 3.4 (page 99-101)

Problem # 1. In figure 3.10 the moment of weight W is 5. The lever balances when  $d_1 = 2\text{ ft}$  and  $d_2 = 1\text{ ft}$  and when  $d_1 = 1\text{ ft}$  and  $d_2 = 3\text{ ft}$ . Determine the weights  $w_1$  and  $w_2$ .

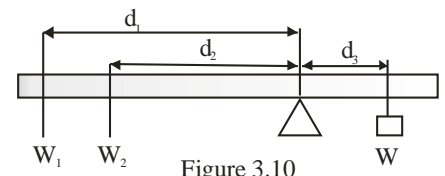


Figure 3.10

**Problem # 7.** Two resistors connected in series have a combined resistance of  $150 \Omega$ . If the resistance of one resistor is  $10 \Omega$  less than the other, find the resistance of each.

**Problem # 15.** The sum of the voltages across two resistors is  $55.1 \text{ V}$ . It was found that 3 times the first voltage is  $9.7 \text{ V}$  less than 4 times the second. What are the two voltages?

**Problem # 17.** Tickets for an industrial exhibit cost  $\$5.00$  for regular admission and  $\$4.00$  for senior citizens. On one day 215 tickets were sold for total intake of  $\$1050$ . How many tickets of each type were sold?

**Problem # 21.** Two machines have a total of 62 moving parts. If one machine has 2 more than 3 times as many moving parts as the other, how many moving parts does each machine have?

**Problem # 25.** One consultant to a firm charges  $\$200$  per day, and another consultant charges  $\$250$  per day. After 13 days the total charged by the two consultants comes to  $\$2950$ . Assuming that only one of the two consultants was called in on any one day, how many days did each one work?

(Problems solved in class # 1, 17)

**HW:** Problem # 7, # 15, # 25

**Exercises / Section 3.5 (page 103)**

- Solve the following systems of equations

$$3x + 2z = -1$$

$$2x - y + 3z = 16$$

**Problem # 3.**  $4x - y - 2z = 7$

**Problem # 7.**  $3x + 4y + 2z = 7$

**Problem # 11.**  $-\frac{4}{x} + \frac{5}{y} - \frac{3}{z} = 1$

$$x + y = 2$$

$$5x - 6y + 8z = 47$$

$$\frac{2}{x} - \frac{1}{y} + \frac{2}{z} = 2$$

$$-\frac{4}{x} + \frac{5}{y} - \frac{3}{z} = 1$$

$$\frac{3}{x} - \frac{4}{y} + \frac{1}{z} = 3$$

(Problems solved in class # 11)

**HW:** Problem # 3, # 7

**Exercises / Section 3.6 (page 111-114)**

**Problem # 5.** 
$$\begin{vmatrix} 2 & -1 & 3 \\ 3 & 0 & -5 \\ 10 & 5 & -10 \end{vmatrix}$$

**Problem # 7.** 
$$\begin{vmatrix} 2 & 3 & 8 \\ -1 & 3 & -2 \\ 5 & -6 & -12 \end{vmatrix}$$

**Problem # 11.** 
$$\begin{vmatrix} -3 & -4 & -7 \\ 3 & 0 & -6 \\ 10 & 15 & 18 \end{vmatrix}$$

- Solve the system of equation by Cramer's rule:

$$2x - y + 3z = 16$$

$$2x - 3y + z = 1$$

**Problem # 19.**  $3x + 4y + 2z = 7$

**Problem # 21**

$$x - 2y - 3z = 1$$

$$5x - 6y + 8z = 47$$

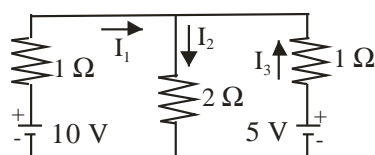
$$x - 4y + 2z = 2$$

**Problem # 25** A portion of  $\$ 5950$  was invested at  $8 \%$ , another portion at  $10 \%$ , and the rest at  $12 \%$ . The total interest income was  $\$ 635$ . If the sum of the second investment and twice the first investment was  $\$ 750$  more than the third investment, find the amount invested in each rate.

**Problem # 27** Three machine parts cost a total of  $\$ 40$ . The first part costs as much as the other two together, while the cost of 6 times the second is  $\$ 2$  more than the total cost of the other two. Find the cost of each part.

**Problem # 31** Find the currents of the circuits by solving the system of equations given

Problem 31



$$I_1 - I_2 + I_3 = 0$$

$$I_1 + 2I_2 = 10$$

$$-2I_2 - I_3 = -5$$

**Problem # 33**

$$-I_1 + I_2 + I_3 = 0$$

$$-I_1 - 3I_2 = -10$$

$$3I_2 - 5I_3 = -6$$

(Problems solved in class # 7, 27, 33).

**HW:** Problem # 5, 11, 19, 21, 25, 31